SHORT RESUME/Synopsis of Ph.D. Topic

Entitled

"Nutritional profiling of certain fishes of Godavari River from Nanded District with respect to pollution"

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For the Degree of
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SHORT RESUME/ SYNOPSIS OF Ph.D. TOPIC

"Nutritional Profiling of certain fishes of Godavari River from Nanded District with respect to pollution."

Abstract :-

Fishes constitute one of major sources of nutritious food for human being as they provide balanced nutrition substance and Supplementary income to rural population in India. The fishes are considered highly nutritious products of the aquaculture system due to the presence of well balanced macronutrients such as proteins, carbohydrates, lipids and micronutrients such as vitamins, minerals and fatty acids. It has been estimated that 50% of Indian population consumes fish and varies from place to place. Protein contents of fish muscle ranges between 16-20%. A protein content of below 15% signifies the food as low protein. Fishes also has high content of lipid which are important for health and are in polyunsattured fatty acid (PUFAS) especially, Eicosaptacnoic Acid (EPA) and Docosahexaenoic acid (DHA) which marks them curative diet also. Fish also contain the perfect balance of all essential vitamins which play an important role in human health. Fish is a rich source of vitamin (A and D). Fish contain high nutritional value, minerals in widely varying quantities including calcium, iron, zinc selenium, iodine, phosphorus and Potassium.

Conservation strategy should be undertaken in every day diet may result in better advanced protection against cardiovascular and coronary heart diseases (CHD) and other bacterial and viral infection helps to maintain the water balance in the human body. *Cirrhinus mrigal*, Shingala (Cat Fish), Katarna fish, Mystus *leucophasis*. These species also found In Godavari river is the most important river in Marathwada region at Nanded District. In Godavari River Pollution is increased day by day because of man made activities contamination of water source by substances which make the mater unusable of for drinking, Cooking, Cleaning, Industries and other activities.

Pollutants like Zinc and copper may cause diseases or act as a poisons. Environment and industrial Pollutants can have both direct and indirect impact on aquatic ecosystem. Pollution can affect fish biota by altering their biochemical

respiratory, developmental and structural function. It also impact on nutritional value of fish. The identification of nutritional value of fish protein, lipid, minerals will carried out with the help of these techniques such as protein estimation with microkjeldahl method, lipid estimation by soxhlet method and also mineral estimation by titrimatric method and the water analysis with help of physico chemical parameters.

Introduction :-

Nutritional Profiling is the Science of classifying or ranking foods by their nutritional composition order to promote health and prevent disease.

Nutrient are chemical substances required by the body to sustain basic functions and are optimally obtained by eating a balanced diet. There are six major classes of nutrients essential for human health. Carbohydrates, lipids, and proteins are considered macronutrients and serve as a source of energy. Minerals and vitamins are considered micronutrients and play essential roles in metabolism.

Fishes are a good source of human food that promotes growth and protection of the body form, a variety of health diseases such as cardiovascular and coronary heart diseases and prevent sickets and mental diseases in children.

The protein present in Fish has high nutritional value because essential amino acids serve as antioxidant element in various nutraceutical industries. A 100 g cooked serving most types of fish provides approximately 18 – 20 g of protein or about third of the average daily recommended protein intake.

Amino acids also have antihypersensitive blood quality maintained. Muscle tissue repairing and system regulation properties in humans in addition fish protein has carious significant bioactive properties such as antioxidative, antithrombi and antithypersensitive properties. Fish protein Prevent a bacteria and viral infection and helps to maintain the water balance in the human body.

Lipids are important for health and are rich in polyunsaturated fatty acid (PUFAS) especially, Eicosaptaenoic Acid (EPA) and Docosahexaenoic acid (DHA) which help to prevent cardiovascular diseases and coronary diseases and mental health in children. Omega 3 fatty acids are mostly essential element in the growth

of children. Many other benefits include prevention against arrhythmias, therapeutics, for asthma patients protection against atherosclerosis and manic depressive illness.

Fish also contain the perfect balance of all essential vitamins which play on important role in human health. Fish is a rich source of vitamin (A and D) and a good source of B group vitamin which are considered to beneficial for growth and development of children. Vitamin A maintain cell development, the formation of bones and teeth and it also improving weak eyesight as well as the treatment of various eye related diseases.

Most children suffer form vitamin D deficiency that causes rickets. It is also found common in adults where other diseases such as osteoporosis, osteomalacia.

Most micronutrients with high bioavailability are present in fish within the range of 0.4 to 1.5 %. Fish contain high nutritional value minerals in widely varying quantities including calcium, iron, zinc, selenium, iodine, phosphorus and potassium.

It has been estimated that 50 % Indian eat fish varies from place to place. The annual per capital consumption of fish for entire population was estimated at 5 – 6 kg where as for fish eating population it was found to be 8 – 9 kg.

The fishes are found in river at Local nanded area is Katarna Fish, Shingala (Cat Fish), *Mystus leucophasis*, and *Cirrhinus Mrigal* etc.

Katarna fish is member of the catfish family with the scientific name *Mystus cavasius.* Katarna is a freshwater fish found in lakes, rivers and ponds. Nutritional value of katarna fish contain Calories – 126 kcal, fat – 6.91 g, protein – 14.94 g, vitamin A – 311.44 IU, vitamin D – 389.50 IU and calcium – 260.75mg, This fish can be cooked in various ways, It prevent the High blood pressure.

Katarna fish is a omnivorous, feeding on wide range of food items i.e. phytoplankton, Zooplankton, insects their larvae and round worms and molluscans.

The *shingala* fish or catfish is one of a king fish available in India and many other countries around the globe. The scientific name of cat fish *Siluriformes*. The nutritional value shingala fish is amazing. It is low calorie side and is rich in many

essential vitamins and minerals, it is extremely rich is fatty acids like omega – 3 and omega 6. The minerals it contain such as phosphorus, selenium, and potassium. It is rich in protein which helps in the building of muscle mass. It is a food fish. There are cooked fish in other countries. These were mainly crustaceans molluscans, fish remains and macrophytes other food of consume algae, deriltous, sand grains.

Mystus leucophasis is an Asian Species of upside down cat fish belonging to the family name Bagridae. *Mystus leucophasis* food of larvae and juvenile fish of Haplochromisspp and insects are the main foods. Molluscs, plant debris, planktonete are accessory foods. Essential nutrients such as carbohydrate, fat protein, minerals and vitamins present in this fish as nutritional value.

Cirrhinus mrigala is an important fish food various countries in the world mrigal is mainly feeding on the bottom, on decayed vegetation although it can also switch to filter feeding mode. The nutrient profile of this fish would provide a guideline for dieticians, medical practitioners of the species and nutritionist in prescribing diet chart for the human population. *Cirrinius mrigala* contains protein 64.76 kcal (132.26 kg), vitamin A – 42.43 IU minerals zinc – 0 .89 mg.

All these species also found in Godavari River. The Godavari River is the most important river in Marathwada region. It has the source of Trimbakashwar in sahayadris hills. Near Nashik this rivers enters in Aurangabad District and flowing in Beed, Parbhani and Nanded District in Godavari River at Nanded. It is rich in fish fauna fishes are formed an important items of human diet from the time man appeared on earth and are primarily caught for this purposes. Fish diet provides protein, fats and vitamins A and D.

River Godavari is the most important river in Marathwada and the source of capture fishery in the region fishes collected during the two year 2005 – 2007 (According to Nanware and Shillewar) for study of biodiversity at Nanded Maharashtra the total number of 26 Species belonging to 18 genera 6 Order and 9 family were recorded from this region at Nanded. In Godavari River at morning time many fisherman are observed for fish catching.

River pollution has already acquired a serious dimension in India's. Fourteen major, 55 Minor and several hundred small river facing acute water pollution

problem. Water pollution is the contamination of water sources by substances which make the water unusable of for drinking, cooking, cleaning, swimming and other activities, pollutants include chemical trash bacteria and parasites all form of pollution eventually make their way to water.

Water pollutant may Cause diseases or act as poisons. Bacteria and parasites in poorly treated sewage may enter drinking water supplies and cause digestive problems such as cholera, and diarrhea, hazardous Chemicals, pesticides and herbicides form industries, from homes and golf course can cause acute toxicity that immediate death or chronic toxicity that can lead to neurological problems or cancers. Many water pollutants enter our bodies when we use water for drinking and food preparation the pollutants enters the digestive tract.

Effect of pollutant (Zn and Cu)

The environmental quality of water bodies has deteriorated markedly over last two decades due to the continuous growth in population, rapid industrialization and the increased rate of discharge of pollutant into the environment. Water bodies especially rivers play a crucial role in assimilating or carrying industrial and municipal waste water , runoff from agricultural fields, metal ions are toxic dangerous and harmful because of their tissue degradation in nature. Among heavy metals, lead, mercury, arsenic and cadmium are nightly toxic where as heavy metals such as zinc, copper, chromium, iron and manganese are required by Organisms in trace quantities. But these same elements can be toxic in larger quantities insatiably copper and zinc which make their way into water and zinc which make their way into water bodies by extensive use in agriculture apart from usage in various industries like textile, tanneries, paints, battery, laundry, photo graphs, copper ware and piping for water distribution systems.

In this regard, the mare abundant metal such copper and zinc may sometimes be of greater hazard. Toxic effect of heavy metal on organs and organ system are major metal on organs and organ system are major the me in classical toxicology. Even though the copper and zinc are essential for the growth and development of the organisms, higher concentration have been reported to be toxic on different organisms zinc and copper in water sediment showed high

concentration particularly in the highly industrialized area compared to non-industrialized zones of the river.

The degree of pollution is generally assessed by studying physical and chemical characteristics.

A. Physical Water Quality Parameters

Turbidity, Temperature, Color, Taste and odour, Solids, Electrical Conductivity.

B. Chemical parameters of water quality

PH, Acidity, Alkalinity, Chlorine, Hardness, Dissolved oxygen.

C. Biological oxygen demand

Bacteria, Algae, viruses

EFFECT OF POLLUTANTS ON FISH NUTRITIONAL VALUE

According to scientist Scott and Sloman (2004), Zala and Penn (2004), Gander et. al (2015), environmental and industrial pollutants can have both direct and indirect impact on aquatic ecosystems and behavior of aquatic organisms. Pollution can affect fish biota by altering their biochemical respiratory population structure, developmental and structural function.

Fish larvae and fingerlings are the most vulnerable life stages of fish which could be severely affected by pesticides as non-target organisms as well as by heavy metals pollution. The most important tissue affected by these pollutants are the gills, kidney and liver.

Polluted fish eat by humans their effect on Body –

According to Scientist Alexandra McInturf, Mathew Savaca (2021), humans eat plastic trained fish and are exposed to plastic particles. As a consequence several chronic illness out breaks occur and people suffer the effect.

Health problem that may result from the contaminants in fish range from small, hard to defect health changes to birth defects as well as mental and physical retardation in newborn. Mothers who eat highly contaminated fish or many years before becoming pregnant may have children who are slower to develop and learn.

Fish taken from polluted water might be harzdous to your health. Eating fish containing chemical pollutants may cause birth defects. Liver damage cancer and other serious health problems.

Review of literature and development in the subject

Many workers studied different biological aspects of rivers in India some of the workers who made extensive work in this field are as follows.

1) Nutrient profiling of fish – B. N. Paul, N. Sridhar, S. Chanda, G. S. Saha and S. S. Giri at Odisha (2016)
2) Quantitative protein estimation by lowery method - Oliver H. Low by (1951)
3) Estimation of Lipid profile in subject J. T. Gohil, P.K Patel and Priyanka Gupta (2011)
4) Mineral Resource Estimation Rossi, Mario. E. and deutsch clayton V. (2014)
5) Protein Extraction and protein estimation by Bradford method

Aim-

- Proposed study will offer understanding the nutritional value of fish.
- I want to prove through my research in Godavari River at Nanded pollution is increased day by day.
- Due to pollution in future I find that quantity of fish is decreasing very much and effect on fish body and its internal organs.
- In the future, eating contaminated fish will effect human, children and adults.
- Due to pollution in a future nutritional value of fish will be very low polluted fish will eating human and their effect on body.
- I will prove my research and I want to suggest government to think over conserve environment.

Methodology to be adopted

1) Fish will be parched and collected.
2) Select stations.
3) Collection of fish species.
4) Identification of fish species.
5) Fish tissue collection.
6) Habitat water, sample collection.
7) Examtion of sample.

Microkjeldohl Method /Lowery Method

1) Estimation of protein in fishes will done by Microkjeldohl method. Microkjeldohl method is adopted to estimate the total nitrogen content in a variety of samples ranging from microbial cells to meats.
2) The microkjeldohl methods involves three steps approach to the quantification of protein digestion, distillation and titration. Digestion of organic material is achieved using concentrated H_2SO_4 heat K_2SO_4 (to raise boiling point) and a catalyst (eg. selenium) to speed up to reaction.
3) The microkjeldohl method involves the digestion of food with a strong acid so that nitrogen is released which is then quantified using titration technique.

SOXHLET METHOD

Estimation of lipid by soxhlet method. Soxhlet method is a traditional technique used for extracting lipid in food there by fish sample is initially dried, ground into small particles and placed in a porous thimble.

Estimation of total lipid amount in a biological sample may be done by gravimetry or by colorimetry.

TITRIMETRIC METHOD

Estimation of minerals by titrimetric method for eg. calcium, iron, Phosphate etc. Water Analysis of Physico- chemical parameters viz temperature, TDS, turbidity, conductivity, PH, BOD, COD, Acidity Alkalinity, Hardness, Nitrates, phosphates, Sulphate, and other parameters of water bodies at regular intervals.

Study Area

The study area is Bank of Godavari river in nanded district for collection of fishes in Godavari river, season wise collection will be there in mansoon, winter, and summer at the following three Stations .

1) MIDC Area
2) City
3) Village

Importance of study

Fish is an important source of nutrients as it provides a good balance of proteins vitamins, fats, lipids, minerals etc. and has a very low caloric content. The nutritional value and health benefits of the fishes are unrecognized and under valued despite a lot of benefits in the health of human. People are still unaware of those benefits.

Fishes are good source of quality protein, but various diseases causes a threat to fish health. Several reports reveal that consumption of under cooked fishes serve as potent source of infection to human and they are widely distributed across the world.

NATIONAL STATUS-

- Nutritional value of fish are excellent source of protein a 100 g cooked serving of most types of fish provides approximately 18-20 g of protein.
- The fish protein is of high quality containing an abundance of essential amino acids.
- When induced in the diet of a pregnant and breast feeding women beneficial to infant brain and eye development.
- Lipid play important physiological role in providing energy, essential fatty acids.
- They have anti-inflammatory effects, decrease platelet aggregation and are essential parts in the cell membranes, brain and nervous tissue.
- The vitamins, minerals, fatty acids in fish can provide significant health benefits.
- Fish generates a number of commercially valuable by products fish oil, meal, fish fertilizer and fish Glue and so on are these by product.

1) **Fish oil :-**

   Fish oil is essential for the proper development of the eyes, brain and reproductive cells, fish oil is the main source of vitamin A.

2) **Fish meal :-**

   Fish meal is a traditionally used liverstock feed supplement. Fish meal has high quality of proteins.

3) **Fish fertilizer :-**

   Fish emulsion is a fertilizer emulsion that produced from the fluid remain of fish processed for fish oil and fish meal industrially.

4) **Fish Glue :-**

   Fish Glue is made by boiling the skin, bones and swim bladder of fish. Fish flue has valued for its use in all manner of product from illuminated manuscripts to mandolin war bow.

   - In painting, Soaps, oils, medicines these by products are widely used.

   Fish are among the most commercially valuable species in Asia. Moreover, fish are considered key species in coastal ecosystems, therefore overfishing to meet market demand is concern.

International Status :-

India is the third largest fish producing and second largest aquaculture nation in the world after china. The blue Revolution in India demonstrated importance of fisheries and aquaculture sector.

Fishes receives greatest place in the national dish in various countries. The growing realization of the importance of fish as food play important role in meeting the ever increasing global food problem in the context of immune potential of resource for exploitation has been instrumental in the initialization of development of fisheries in many countries.

Proposed work plan / formulation and structure study

Year wise plan of work and target to be Achieved.

1) **First Year :-**
   - Introduction, Course work, Review of Literature Referencing books and methodology.
   - Visit to Bank of Godavari River at nanded and various localities of MIDC area, City and Village.
   - Collection of fishes and Preservation of fish Identification of fish.
   - To take a water sample in Godavari River with Fishers.
2) **Second Year :-**
   - Study of maturity, spawning, reproductive organs, Morphometric measurement, length, weight and food habits.
   - Study of fish nutritional value estimation of proteins, estimation of lipid and estimation of minerals.
   - Study of polluted water to take a physical and chemical water parameters. Study of polluted water effect on fish body.
3) **Third Year :-**
   - Summery, Conclusion, Documentation, Analysis of result, writing and typing of thesis submission of thesis.

Expected outcomes:-

1) It will be research and new suggestions to government to control polluted water direct and indirect impact causes aquatic ecosystems.
2) It will be beneficial for new researcher and students for study of research regarding review and literature.
3) It will be beneficial for humans beings due to some nutritional value and medicinal value.
4) It will be decided that MIDC polluted habitat affects nutritional value of fishes.
5) It will be concluded that pollution range is near at MIDC aquatic habitat than city aquatic habitat.
6) It will decided that very low pollution occurs at village aquatic habitat that affect less toward nutritional value of fishes.

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